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April 23, 2002

VIA HAND DELIVERY (20 Copies)

California Regional Water Quality Control Board
Mr. John Minan, Chairman
San Diego Region
9174 Sky Part Court, Suite 100
San Diego, CA 92123

Re: Amended Complaint No. R9-2002-003 Administrative Civil Liability for Mandatory Minimum Penalties for Violation of Order No. 96-41: NPDES No. CAG919002 Permanent Groundwater Extraction Facility; **Agenda Item 6**

Facility: The Promenade at Pacific Beach, 4150 Mission Blvd., San Diego, California

Dear Chairman Minan and Regional Board Members:

We are in receipt of the Amended Complaint dated April 19, 2002 regarding the assessment of mandatory minimum penalties against Promenade Mall Development Corporation at 4150 Mission Blvd., San Diego, California ("Promenade"). On March 26, 2002, we provided a letter addressed to Mr. John Robertus, Executive Director, detailing our concerns and objections to the alleged violations. This letter is an update to our March 26, 2002 letter, addressing our continued objection to the assessment of penalties against Promenade.

Background:

Promenade Mall Development Corp. operates a two-story retail shopping center with one level of underground parking in Pacific Beach. Due to area parking deficiencies and building height restrictions, it was necessary to position the floor of the garage at an elevation about 3 feet below the sea level of the Pacific Ocean, located approximately 350 feet to the west. Consequently, a passive subterranean dewatering system was installed beneath the parking garage during construction of the shopping center to collect and remove ocean-fed groundwater that would otherwise flood the garage.

The dewatering system is a passive system, in that perforated pipelines have been placed underground around the perimeter of the garage floor slab. Groundwater flows into those pipelines and is then transported by gravity through the pipes to a sump. The

dimensions of the sump are: 6 feet wide by 6 feet long by 8.7 feet deep (below the top of the floor slab). When the water reaches a certain level in the sump, one of the 2 pumps is activated and the water contained in the sump is pumped out of the sump, through a pipeline running along the border of the Promenade property to a city-owned pump station (Pump Station #17). From that point, the water was originally discharged through a pipeline directly into Mission Bay. However, in 1996 the City of San Diego constructed a new Pump Station N at Santa Clara Point, which intercepted the water from Pump Station #17. Pump Station N contains a "low flow interceptor" to divert water from Pump Station N to the City's sanitary sewer system, rather than allowing the water to be discharged into Mission Bay. The discharge from Promenade is, consequently, part of the volume of wastewater that is intercepted by the City of San Diego at Pump Station N and diverted to the Point Loma Treatment Plant.

Promenade's permanent dewatering operation has occurred continuously since 1985. Promenade obtained its first discharge permit from the RWQCB in 1985, Order No. 85-75. This first permit was an individual permit, designed specifically for the permanent dewatering operation engaged in by Promenade.

In or about 1992, Order No. 85-75 reportedly expired and Promenade was authorized to discharge wastewater under Order 91-10. Nevertheless, although the discharges were reportedly authorized under Order 91-10, Order 91-10 was an inadequate replacement to the individual permit previously granted to Promenade, in that Order 91-10 prohibited discharges from permanent dewatering operation (Prohibition #10) and discharges of extracted groundwater in basins with designated beneficial uses (Prohibition #3).

Order 91-10 was later replaced in 1996 by Order 96-41. Again, while Promenade was advised by the RWQCB that its discharges were subject to Order 96-41, Order 96-41 provided an inadequate replacement to the individual permit previously issued to Promenade, in that Order 96-41 was a permit for "General Waste Discharge Requirements for Groundwater Extraction and Similar Waste Discharges ***from Construction and Remediation Projects*** to Surface Waters within the San Diego Region Except for San Diego Bay." The permanent dewatering project operated by Promenade was neither for a construction project, nor a remediation project.

On February 11, 2002, Promenade received notification from the RWQCB for numerous alleged violations of effluent limitations set forth in Order 96-41. The RWQCB assessed a minimum mandatory penalty for each alleged violation, totaling $78,000 in assessed penalties. Following meetings with RWQCB Staff, an Amended Complaint was issued on April 19, 2002, reducing the assessed penalties to $51,000. For the reasons discussed below, no violations were committed by Promenade and each of these penalties has been erroneously assessed against Promenade and should be dismissed.

Promenade has Not Violated RWQCB Order Because RWQCB Order 96-41 is Not Applicable to Promenade:

1. Order 96-41 did not apply to permanent groundwater dewatering operations.

As stated above, Order 96-41 was not applicable to permanent groundwater dewatering operations. Order 96-41 applied to "Waste Discharge Requirements for Groundwater Extraction and Similar Waste Discharges from Construction and Remediation Projects to Surface Waters within the San Diego Region." The discharges from Promenade were not from either a construction project or a remediation project.

In the discharge application requirements listed in paragraph 14 of the "Reporting" section, the first information on the application form is "Project Type"; however, only two options are given: remediation or construction.

Moreover, in October 2001, the RWQCB issued yet another new discharge permit, Order 2001-96. In a letter to Promenade dated October 12, 2001, the RWQCB states: "Substantial changes to the new general permit (2001-96) include the following: Order No. 2001-96 provides coverage for permanent groundwater projects." This statement further supports the fact that Order 96-41 did not apply to permanent groundwater dewatering projects.

The significance of this oversight is related to the establishment of numerical values for effluent limitations. As stated in Order 96-41, in establishing effluent limitations based on Best Available Technology (BAT), consideration is given to (among other factors): "appropriate technology for the category or class of which the discharger is a member"; the "process employed"; "application of various types of control techniques"; and "Process changes". These factors clearly point out that the Promenade is not in the same category or class as a construction or remediation project. Due to the fact that: (1) the Promenade discharge results from passive groundwater collection and a closed sump pump system, (2) there is no process involved, and (3) the discharger has no "control" over the incidental influx of naturally occurring substances, the establishment of effluent limitations based on best available control technology are inadequate for the Promenade discharges.

The above argument not withstanding, since 1993 the management of the Promenade has diligently endeavored to maintain substantial compliance with the monitoring and reporting requirements of Order 91-10 and 96-41. Efforts aimed at compliance included voluntarily conducting supplemental, non-scheduled discharge analyses when incidental exceedances of effluent limitation occurred. **It was the Promenade management's clear understanding that the numerical effluent limitations were to serve as early-warning indicators for potentially significant problems. The RWQCB staff's acquiescence to the voluntary additional analyses**

and the lack of any citations for significant or serious exceedances of effluent limitations reinforced this understanding. Had the Promenade management been apprised that the mandatory minimum penalties would be so strictly enforced on the basis of inappropriately established effluent limitations, they would have requested a review of the applicability of the General Permit (which clearly covered only construction and remediation projects) to the actual conditions at the Promenade.

2. Promenade discharges less than 100,000 gallons per day.

Even if Order 96-41 applied to the discharges made by Promenade, Promenade was technically exempt from the Order, as it discharged (and continues to discharge) less than 100,000 gallons per day. Order 96-41specifically applies to groundwater extraction waste discharges of ***greater than 100,000 gallons per day,*** or discharges less than 100,000 gallons per day where the discharged groundwater contains ***"pollutants"*** in excess of discharge limitations. "Pollution" is defined in the Water Code as any "alteration of the quality of the waters of the state by waste to a degree which ***unreasonably affects"*** beneficial use waters. (See California Water Code section 13050(l).)

The early Promenade permits contained no volumetric limitation on the amount of groundwater that could be discharged under the permit. However, Order 96-41 required daily monitoring of the volume of water discharged. In an effort to calculate the volume of groundwater being discharged, Promenade installed hour meters on the two groundwater pumps. Promenade used these hour meters to calculate the volume of water being discharged by multiplying the number or hours the pumps operated by the capacity of the pumps. Unfortunately, this proved to be an inaccurate method of calculating the volume of water being discharged for two reasons.

First, the pump manufacturer supplied erroneous information to Promenade relating to the pump capacity. Promenade was informed by the manufacturer that each pump was a 3 horsepower ("hp") pump. However, following replacement of the pumps in June 2001, Promenade learned that the original pumps were in fact 1.5 hp pumps, not 3 hp pumps. The new pumps installed in June 2001 are rated at 1 hp.

Second, as the pumps aged, they became much more inefficient and consequently, operated for longer periods of time to pump the same volume of water. Prior to replacement in June 2001, the pumps were operating for nearly 24 hours per day, whereas when the pumps were new, the operation time was approximately 3 hours per day.

As a direct result of these two factors, the flow calculations provided by Promenade to the RWQCB for the monitoring periods between June 1993 and June 2001, although satisfactory for compliance with the reporting requirements of the

discharge authorizations in place at the time, were inexact overestimations of the volume of water discharged. Upon replacement of the pumps, and acquiring accurate pump capacity data, in June 2001, Promenade was able to more accurately calculate the volume of water discharged from the dewatering operation.

As noted above, the foundation dewatering system is a passive collection system which delivers the groundwater to a sump vault where the discharge pumps periodically pump the water up to the discharge conduit. Therefore, the maximum daily discharge volume is solely a function of the rate at which the groundwater is collected and flows under gravity through the passive collection system. The following discussion of pump capacities and efficiencies is presented only for the purpose of describing the methods used to estimate the daily discharge volumes: the maximum-connected pump capacity is not appropriate in estimating the maximum possible daily discharge volume.

The following results reflect the corrections discussed above (pump replacement). The following table shows the flowrate data for each month (June through November 2001) since the newest 1-hp pumps were installed.

MONTH	MINIMUM DAILY FLOW (gallons)	AVERAGE DAILY FLOW (gallons)	MAXIMUM DAILY FLOW (gallons)	MONTHLY TOTAL (gallons)
June 2001	5,580	24,614	46,500	738,420
July 2001	13,020	25,380	45,570	786,780
August 2001	15,810	26,880	36,270	833,280
September 2001	14,880	26,319	46,500	789,570
October 2001	22,320	25,885	29,760	800,730
November 2001	4,650	25,614	51,150	768,412
December 2001	9,300	25,620	44,640	794,220
January 2002	18,600	24,780	34,410	768,180
February 2002	13,020	23,881	32,550	668,670
Totals/Average	13,020	25,441	40,816	775,950

The time-series plot of all the daily discharge data for the time period is shown in the attached Chart 1. The attached Chart 2 is a distribution histogram of the sorted daily discharge data, showing that for statistical purposes the population data is normally distributed. Statistical analysis of the data gives an average daily discharge of 25,447 gallons with a standard deviation of 5,894. Based on the Standard Normal Density Function for right-tailed (upper limit) areas under the normal distribution probability curve, statistical calculations were performed to estimate the probability of exceeding selected maximum daily discharge volumes; these estimates indicate:

a) The estimated daily discharge rate associated with a 1% probability of occurrence (99th percentile) is 39,163 gpd;

b) The estimated daily discharge rate associated with a 100-year occurrence (probability of 0.0000274) is 50,792 gpd;

c) The statistical calculations indicate that a daily discharge rate equal to 100,000 gpd would be situated over 12.6 standard deviations to the right of the mean; this position is off of any published normal distribution function tables and, therefore, the probability of occurrence is negligible.

As can be seen from the data provided, Promenade's discharges were and are well below the 100,000 gallon per day limit established in Order 96-41. While Order 96-41 may also apply to discharges less than 100,000 gallons per day, at no time have the discharges by Promenade ***"unreasonable affected"*** any surface water to which they may have been discharged.

The water discharged by Promenade is **ocean water!** Promenade does not handle, use, store, treat, or otherwise alter the water which passively flows into Promenade's sump from the ocean. The water merely passes through Promenade's property, via a sump and a pump, on its way to the City's sanitary sewer system or to Mission Bay. None of the exceedances alleged by the RWQCB Staff reflect any unreasonable affect on the receiving water. Consequently, Promenade has not discharged any "pollutants."

Mr. John Robertus responded to this argument by Promenade by stating that the "minimum flow requirement of 100,000 gallons per day does not apply to permanent operations like Promenade, because of the potential to cause pollution, contamination, or nuisance in the receiving water." (See Mr. Robertus' letter of April 4, 2002.) Again, we ask, how does Promenade have the "potential to cause pollution, contamination or nuisance in the receiving water" when the discharges from Promenade are ***untouched ocean water!?!***

Based upon the Order's own established daily flow rates, Promenade is exempt from Order 96-41.

3. Promenade's discharged groundwater is diverted by the City of San Diego to the sanitary sewer system and, consequently, is not discharged into Mission Bay.

As discussed above, Promenade's dewatering system is a passive system. The pumps do not operate unless and until groundwater has, as a result of gravity, flowed into the sumps and reached a level that activates (alternately) one of the two pumps to empty the sump. The discharged water is then sent through a pipeline to City-owned

Pump Station #17, where it is then diverted from discharge into Mission Bay and transported to City-owned Pump Station N at Santa Clara Point. Because Pump Station N contains a "low flow interceptor," the water is then again diverted by the City of San Diego from discharge into Mission Bay to the Point Loma Treatment Plant.

Therefore, it is unlikely that the water discharged by Promenade ever reaches Mission Bay. It is instead (and outside of Promenade's control) diverted to the City of San Diego's sanitary sewer system. The City of San Diego has provided copies of the Station Records for Pump Station N at Santa Clara Point to the RWQCB Staff on April 10, 2002. Those records show that the interceptor pumps operate continuously (24/7) at a flow rate of 90 gallons/minute. When the flow exceeds 90 gallons/minute, the larger pumps turn on sending water into Mission Bay. The records provided by the City of San Diego show the exact dates and times that the larger pumps, which direct water into Mission Bay (pumps P1 and P2), operated. The City of San Diego will also be providing copies of the capacity ratings for the pumps at Pump Station N, which we expect to have prior to the May 8, 2002 meeting, and will provide to the Board.

The Penalties Assessed Against Promenade are Inappropriate Because Promenade Experienced an Operational Upset:

RWQCB Order 96-41 states that an operational upset is an affirmative defense to a noncompliance violation (Paragraph 14, page 30). Further, California Water Code section 13385(f) provides that an exceedance caused by an operational upset that leads to simultaneous violations of more than one pollutant ***shall*** be treated as a single violation.

An operational upset is defined as "an exceptional incident which causes simultaneous, unintentional, unknowing, temporary noncompliance with more than one . . . effluent discharge pollutant parameter." An "exceptional" incident is a "nonroutine malfunctioning of an otherwise generally compliant facility." Promenade, with the natural degradation and deterioration of its pumps, experienced an operational upset which caused simultaneous, unintentional, unknowing and temporary noncompliance with several discharge pollutant parameters.

Promenade operated two pumps for the dewatering operation. These pumps were installed in June 1998. Over time, the pumps began to degrade, deteriorate, and become more inefficient. Beginning in December of 2000, Promenade began to experience elevated levels of Total Suspended Solids, zinc and copper. While its discharge permit only requires Promenade to test for copper, and zinc on a semi-annual basis, Promenade undertook to test its discharged water at a much greater frequency for these constituents in an effort to determine what was causing the elevated levels. ***As a result of Promenades extreme diligence and good-faith attempts to discover the cause of the***

elevated constituent levels and correct the problem, Promenade was hit with fourteen (14) alleged violations!

Unsuccessful in finding any other cause for the elevated levels of TSS, zinc and copper in its discharged water, in June 2001, Promenade replaced both pumps. Simultaneously with the replacement of the pumps, no further elevated levels of these constituents were reported. It was determined that the continued deterioration of the old pumps was resulting in the depositing of solids and metals into the pumped and discharged groundwater.

Promenade has obtained documentation from the pump manufacturer that evidences that the main constituents in the brass pumps used by Promenade are copper (79%) and zinc (12-16%). As the pumps degrade, these metals leach out into the sump and are pumped out with the captured water. A copy of the manufacturer's data is attached to this letter.

Since replacing the pumps, Promenade has not experienced and similar exceedance. Furthermore, not only has Promenade replaced the two pumps, but Promenade has also had the sump box cleaned of any residue that may potentially cause any further exceedances.

Due to the operational upset caused by the deteriorating pumps, Promenade should not be subject to any penalties for the exceedances caused thereby. The violations alleged to have occurred on December 29, 2000, February 27, 2001, and June 21, 2001, were all caused by this operational upset and Promenade should not be subject to mandatory minimum penalties for those violations.

RWQCB Staff has recognized and accepted the operation upset data provided for the alleged violations of zinc on December 29, 2000 and February 27, 2001, however, the Staff refuses to recognize that the copper and TSS exceedances on those same dates were caused by the Promenade's operational upset. Moreover, while the Water Code provides that an exceedance caused by an operational upset that leads to simultaneous violations of more than one pollutant ***shall*** be treated as a single violation, the RWQCB Staff has recommended penalties in violation of this statute, assessing **two** $3,000 penalties for the zinc exceedance caused by operational upset.

Since there has been confusion among the Regional Boards and their interpretation of the application of the penalties associated with operational upsets, the legislature is in the process of clarifying the intent of the statute. A Bill is presently before Congress which amends the operation upset provisions of the section 13385(f), providing that: "a single operational occurrence that leads to violations of one or more pollutant parameters, ***even if the occurrence lasts for more than one day***, shall be treated as a single violation."

Consequently, the exceedances experience by Promenade on December 29, 2000, February 27, 2001, and June 21, 2001, of zinc, copper, and TSS, all of which were due to an operational upset, the degradation of Promenade's pumps, should be treated as a single operational upset for which **one** penalty of $3,000 would apply.

The Penalties Assessed Against Promenade are Excessive:

1. Multiple penalties have been inappropriately assessed against Promenade.

An exceedance of a single effluent limitation based on instantaneous maximums or hourly averages should be counted as no more than one violation per day. (See *SB 709 and SB 2165 Questions and Answers*, SWRCB, 4/17/01, Question 41.) Promenade was assessed multiple penalties for alleged violations of a single effluent limitation on the following dates: June 23, 2000, October 30, 2000, December 29, 2000, and June 21, 2001.

- On June 23, 2000, Promenade was assessed three penalties for one alleged cyanide instantaneous max violation;
- On October 30, 2000, Promenade was assessed two penalties for one alleged TSS instantaneous max violation;
- On December 29, 2000, Promenade was assessed two penalties for one alleged TSS instantaneous max violation, and three penalties for one alleged copper instantaneous max violation; and
- On June 21, 2001, Promenade was assessed three penalties for one alleged copper instantaneous max violation.

If Promenade is subject to any penalties, each instantaneous max violation should be counted as only one penalty, not multiple penalties.

Promenade was also inappropriately assessed penalties for alleged violations of 30-day averages and 6-month medians of certain constituents. Order 96-41 defines a 30-day average as "the arithmetic mean, using the results of analyses of all samples collected during any **30 consecutive calendar day** period." (Order 96-41, paragraph 23, page 32.) No samples were taken by Promenade for any constituent on any 30 consecutive calendar day period. Consequently, penalties cannot be assessed against Promenade for alleged violations of a 30-day average.

Similarly, Order 96-41 defines a 6-month median as "a moving median of daily values for any 180-day period in which **daily** values represent flow-weighted average concentrations within a 24-hour period." (Order 96-41, paragraph 22, page 31-32.) Again, no constituent was sampled by Promenade on a daily basis for 180 days.

Penalties should not have been assessed against Promenade for alleged violations of any 6-month median.

One single sample was used to calculate both a 30-day average and a 6-month median, and based upon that single sample (which is not in any way representative of a 30-day average or a 6-month median), multiple violations were inappropriately assessed against Promenade.

2. The penalty assessed on December 29, 2000, for a chronic violation of TSS is contrary to law.

The Violation Summary notes an exceedance on December 29, 2000, for a TSS instantaneous max. The violation is specifically noted as a chronic violation, citing Water Code section 13385(i)(1). Water Code section 13385(i)(1) provides that a mandatory minimum penalty shall be assessed for each violation whenever the discharger exceeds a waste discharge requirement effluent limitation ***four or more times in any period of six consecutive months.***

The Violation Summary clearly shows that in the six consecutive months prior to December 29, 2000, only **two** violations are alleged (on October 30, 2000). Consequently, the $3,000 penalty assessed for the chronic violation on December 29, 2000, is inappropriate and should be removed.

3. Order 96-41 requires frequent retesting of toxicity exceedances, unfairly subjecting Promenade to multiple penalties.

Required retesting (outside of normal sampling frequency requirements) should not add to the penalty amount. Order 96-41 at page 35 requires toxicity tests to be performed at 2-week intervals upon the showing of an exceedance. This is a ***remedial*** measure to identify the cause of the exceedance and rectify the problem and should not be penalized as additional violations.

When testing by Promenade resulted in a toxicity exceedance, Promenade engaged in the retesting required by Order 96-41 until no further toxicity exceedances were reported. As a result of these ***remedial*** measures undertaken by Promenade, Promenade was again subjected to penalties for the **required** retesting of toxicity (June 18, 2001 and August 23, 2001.)

Subjecting those parties in compliance with Order 96-41 (by conducting required frequent retesting) to multiple penalties is inequitable and should not be permitted by the RWQCB. The penalties assessed against Promenade for this required retesting should be withdrawn.

Promenade has no control over water discharged:

To penalize Promenade for water over which it has no control is inequitable. Promenade's dewatering system is a passive collection system; the maximum daily discharged volume is solely a function of the rate at which the groundwater flows under gravity and is collected in a sump through the passive collection system. The water infiltrating the passive collection system comes from the Pacific Ocean, travels through a pipe and is supposed to go into Mission Bay. Promenade engages in no treatment or use of the collected or discharged water. The fact that the water contains suspended solids is a naturally occurring event when collecting and pumping briny seawater.

Moreover, the water discharged by Promenade does not even make it to its intended destination of Mission Bay. The water is piped to a pump station, and then diverted by City of San Diego to another pump station. Then, instead of being discharged into Mission Bay as was intended by Promenade and the RWQCB, the water in reality is intercepted by the City of San Diego and redirected to the City's sanitary sewer system.

The RWQCB's Complaint for Administrative Civil Liability is too Late:

The RWQCBs delay in notifying Promenade of the alleged violations is too late and contrary to the purposes of the statute. "The intent of these portions of the California Water Code (§13385 (h) and (i)) is to assist in bringing the States waters into compliance with WDRs. RWQCBs should issue mandatory minimum penalties within **seven** months of the first qualifying violation, or **sooner** if the total mandatory penalty amount is $30,000 or more. This will encourage the discharger to correct the violation in a timely manner." (See *The State Water Resources Control Board Water Quality Enforcement Policy, Draft Revised Policy*, SWRCB, Cal EPA, 10/19/00, page 22, emphasis added.)

Here, the RWQCB delayed in notifying Promenade of any violations for which a penalty would be sought, prejudicing the rights of Promenade. The first alleged violation is dated March 31, 2000; however the RWQCB Complaint was not provided to Promenade until February 11, 2002, nearly ***two years*** later. Moreover, the RWQCB assessed penalty of $51,000 is significantly more than the $30,000 penalty noted in the RWQCB's own enforcement policy. Had Promenade been notified of these alleged violations 16 months earlier, Promenade could have undertaken steps, including enlisting the aid of the RWQCB, to identify and correct its equipment problem and avoid significant further penalties.

Conclusion:

For the following reasons, Promenade should not be subject to any of the $51,000 in penalties assessed by the RWQCB for alleged violations:

1. Promenade discharges less than the 100,000 gallons per day minimum, which exempts it from Order 96-41.
2. Water from Promenade's dewatering operation was not discharged to surface water, but instead was discharged to the City of San Diego's sanitary sewer system.
3. Promenade's violations were caused by a single operational upset, which has been corrected.
4. The calculation of penalties assessed against Promenade was inappropriate.
5. Order 96-41 requires frequent retesting of toxicity exceedances, unfairly subjecting Promenade to multiple penalties for undertaking remedial measures.
6. Promenade has no control over the waters collected or discharged.
7. The RWQCB's Complaint for Administrative Civil Liability is too late.

For these reasons, the Complaint against Promenade should be dismissed. We note that an administrative hearing has been set before the Regional Water Quality Control Board for 9:00 a.m. on May 8, 2002. It is intention to appear and present our case at that hearing.

We look forward to addressing these issues at the public hearing on May 8, 2002. In the meantime, please feel free to contact me with any questions you may have.

Yours very truly,

VARCO & ASSOCIATES

Suzanne R. Varco

SRV/ssr
Enclosures

cc: Michael Katz, Promenade Mall Development Corp.
Gary Clossin, I-Cubed Consulting

Attn: Gary Quasin

From: Jill Bourdeau

GOULDS PUMPS
ENGINEERING STANDARDS

MATERIALS MANUAL

CAT. ES-2
PAGE B--01.101
SUPSD. REV. 3
DATE 5-2-94

Silicon Brass	ASTM B584-93a C87500 (MODIFIED)
MATERIAL DESIGNATION	1101

THIS SPECIFICATION COVERS THE REQUIREMENTS FOR COPPER ALLOY C87500 SAND CASTINGS FOR GENERAL APPLICATIONS.

CHEMICAL REQUIREMENTS		PERCENT
COPPER, MIN.	-	79.0
ZINC	-	12.0 - 16.0
SILICON	-	3.0 - 5.0
ALUMINUM	-	0.0 - 0.50
IRON	-	0.0 - .175
TIN	-	0.0 - .175

MECHANICAL PROPERTIES:

TENSIL STRENGTH, MIN PSI	-	60,000
YIELD STRENGTH, MIN PSI	-	24,000
ELONGATION IN 2" %	-	16

THIS SPECIFICATION REFERENCES TO ASTM B584-93a C87500 (LATEST REVISION) WHICH SHALL BE THE CONTROLLING DOCUMENT IN THE MANUFACTURE OF THIS MATERIAL, EXCEPT FOR THE CHEMICAL REQUIREMENTS & TEST FREQUENCIES. MATERIAL SHALL CONFORM TO THE CHEMICAL REQUIREMENTS STATED ABOVE. TEST FREQUENCIES SHALL BE AS STATED BELOW.

CONTAMINATION BY ANY OTHER ELEMENT SHALL NOT EXCEED .05 PERCENT

THE FOUNDRY SHALL TEST EVERY FURNACE HEAT, FOR THE PURPOSE OF CHEMICAL ANALYSIS. A TEST SHALL BE PULLED ONCE A WEEK TO TEST FOR MECHANICAL PROPERTIES. EXCEPT WHEN SPECIFIED AS REQUIRED ON A SPECIAL CHEMICAL AND PHYSICAL REQUEST.

USES:
GOULDS STANDARD GENERAL PURPOSE BRASS.

Color Code : WHITE

ECN:#4508

DR BY KEL	CH BY DER	1101	REV. 4
DATE 1/26/77		SHEET 1 OF 1	

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